OA 3302 Summer 2004 Assignment 6
Due date: September 9, 2004

1. To estimate EX, $X_1, \ldots, X_{16}$ have been simulated with the following values resulting: 10, 11, 11.5, 11.5, 14, 8, 13, 6, 15, 10, 11.5, 10.5, 12, 8, 16, 5. Based on these data, if we want the standard deviation of the estimator of EX to be less than 0.1, roughly how many additional simulation runs will be needed?

2. To estimate μ, we generated 20 independent values having mean μ. Suppose the successive values were 102, 93, 112, 111, 131, 124, 107, 122, 114, 136, 95, 141, 133, 119, 145, 122, 139, 151, 117, 143. How many additional random variables do you think we will have to generate if we want to be 99 percent certain that our final estimate of μ is correct to within ± 0.5?

3. (*Extra credit*) Suppose the random variables $X_1, \ldots, X_n$ are IID, and let

$$S^2(n) = \frac{1}{n-1} \sum_{i=1}^{n} (X_i - \bar{X}(n))^2.$$

   Show that $ES^2(n) = \operatorname{Var} X$